**Space Weather Highlights**
**16 July - 22 July 2018**

**SWPC PRF 2238**
**23 July 2018**

Solar activity was very low throughout the period. Region 2716 (N16, L=199, class/area=Axx/10 on 21 Jul) was briefly the sole active region with sunspots, but was largely unproductive. No Earth-directed CMEs were observed this period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached moderate levels on 22 Jul with normal levels observed through the rest of the period.

Geomagnetic field activity was quiet to unsettled on 16-17, 20-21 Jul with generally quiet conditions observed throughout the remainder of the period. The activity on 20-21 Jul was associated with the weak influence of a positive polarity coronal hole high speed stream.

**Space Weather Outlook**
**23 July - 18 August 2018**

Solar activity is expected to be very low throughout the outlook period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 23-31 Jul and moderate levels are expected on 01-11, and 18 Aug. Normal levels are expected throughout the remainder of the outlook period.

Geomagnetic field activity is likely to reach G1 (Minor) geomagnetic storm levels on 24 Jul due to the influence of a negative polarity coronal hole high speed stream. Active conditions are expected on 23, 25 Jul and 17 Aug due to the influence of multiple, recurrent coronal hole high speed streams. Quiet and quiet to unsettled conditions are expected throughout the remainder of the outlook period.

## *Daily Solar Data*

| Date | Radio Flux 10.7cm | Sun spot No. | Sunspot Area ($10^{-6}$ hemi.) | X-ray Background | | Flares | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | X-ray | | | Optical | | | |
| | | | | | | C | M | X | S | 1 | 2 | 3 | 4 |
| 16 July | 72 | 0 | 0 | A2.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 July | 71 | 0 | 0 | A2.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 July | 71 | 0 | 0 | A2.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 July | 71 | 0 | 0 | A2.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 July | 71 | 0 | 0 | A2.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 July | 70 | 11 | 10 | A2.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 July | 68 | 0 | 0 | A1.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## *Daily Particle Data*

| Date | Proton Fluence (protons/cm$^2$ -day -sr) | | | Electron Fluence (electrons/cm$^2$ -day -sr) | | |
|---|---|---|---|---|---|---|
| | >1 MeV | >10 MeV | >100 MeV | >0.6 MeV | >2MeV | >4 MeV |
| 16 July | 5.2e+05 | 1.9e+04 | 3.7e+03 | | 1.0e+06 | |
| 17 July | 4.4e+05 | 1.8e+04 | 3.4e+03 | | 2.0e+05 | |
| 18 July | 2.9e+05 | 1.9e+04 | 3.6e+03 | | 2.4e+05 | |
| 19 July | 2.9e+05 | 1.8e+04 | 3.7e+03 | | 3.4e+05 | |
| 20 July | 6.1e+05 | 1.8e+04 | 3.8e+03 | | 4.8e+05 | |
| 21 July | 4.6e+05 | 1.8e+04 | 3.6e+03 | | 1.5e+06 | |
| 22 July | 3.0e+05 | 1.8e+04 | 3.5e+03 | | 5.3e+06 | |

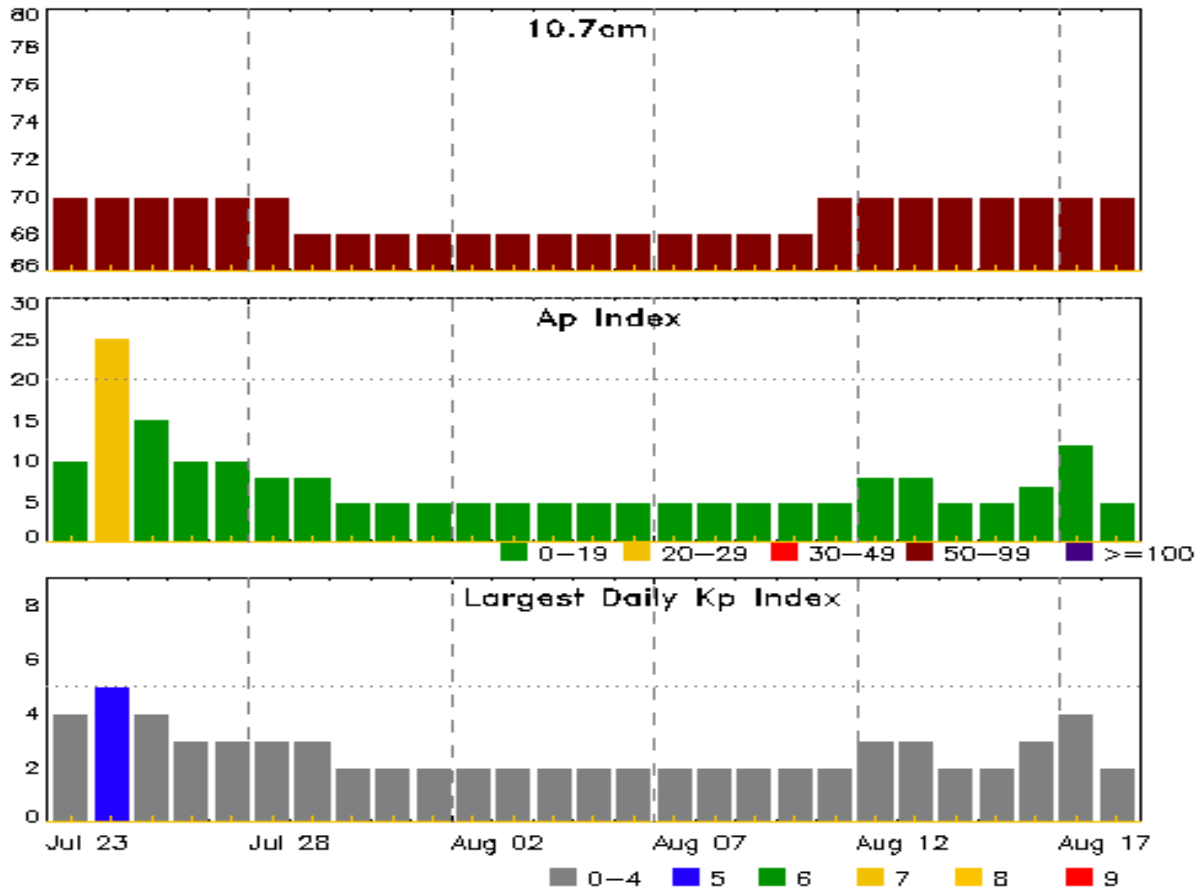
## *Daily Geomagnetic Data*

| Date | Middle Latitude Fredericksburg | | High Latitude College | | Estimated Planetary | |
|---|---|---|---|---|---|---|
| | A | K-indices | A | K-indices | A | K-indices |
| 16 July | 8 | 1-2-2-2-2-2-3-2 | 14 | 1-2-4-5-2-2-1-2 | 9 | 1-2-3-2-2-2-3-3 |
| 17 July | 9 | 1-3-4-2-2-2-1-1 | 20 | 1-4-4-2-2-2-1-6 | 9 | 1-3-3-2-1-2-1-2 |
| 18 July | 4 | 1-1-1-1-2-1-1-1 | 1 | 1-1-0-0-0-0-1-0 | 4 | 1-1-1-1-1-1-1-1 |
| 19 July | 4 | 1-0-1-2-1-2-2-1 | 2 | 1-0-1-1-0-1-1-1 | 4 | 1-1-1-1-1-1-1-1 |
| 20 July | 7 | 2-1-2-3-2-1-2-2 | 15 | 2-1-2-5-5-1-1-1 | 7 | 2-1-2-3-2-1-2-2 |
| 21 July | 10 | 2-2-3-3-3-2-2-2 | 27 | 2-3-4-6-5-4-2-1 | 11 | 2-2-3-3-3-2-2-2 |
| 22 July | 5 | 2-2-1-2-2-1-1-1 | 6 | 1-2-2-4-1-1-0-0 | 6 | 2-1-2-2-1-1-1-1 |

## *Alerts and Warnings Issued*

| Date & Time of Issue UTC | Type of Alert or Warning | Date & Time of Event UTC |
|---|---|---|
| 17 Jul 0552 | WARNING: Geomagnetic K = 4 | 17/0551 - 1200 |
| 21 Jul 1333 | WARNING: Geomagnetic K = 4 | 21/1334 - 2359 |
| 21 Jul 1831 | WATCH: Geomagnetic Storm Category G1 predicted | |

## *Twenty-seven Day Outlook*




| Date | Radio Flux 10.7cm | Planetary A Index | Largest Kp Index | Date | Radio Flux 10.7cm | Planetary A Index | Largest Kp Index |
|---|---|---|---|---|---|---|---|
| 23 Jul | 70 | 10 | 4 | 06 Aug | 68 | 5 | 2 |
| 24 | 70 | 25 | 5 | 07 | 68 | 5 | 2 |
| 25 | 70 | 15 | 4 | 08 | 68 | 5 | 2 |
| 26 | 70 | 10 | 3 | 09 | 68 | 5 | 2 |
| 27 | 70 | 10 | 3 | 10 | 68 | 5 | 2 |
| 28 | 70 | 8 | 3 | 11 | 70 | 5 | 2 |
| 29 | 68 | 8 | 3 | 12 | 70 | 8 | 3 |
| 30 | 68 | 5 | 2 | 13 | 70 | 8 | 3 |
| 31 | 68 | 5 | 2 | 14 | 70 | 5 | 2 |
| 01 Aug | 68 | 5 | 2 | 15 | 70 | 5 | 2 |
| 02 | 68 | 5 | 2 | 16 | 70 | 7 | 3 |
| 03 | 68 | 5 | 2 | 17 | 70 | 12 | 4 |
| 04 | 68 | 5 | 2 | 18 | 70 | 5 | 2 |
| 05 | 68 | 5 | 2 | | | | |

## *Energetic Events*

| | Time | | | X-ray | | Optical Information | | | Peak Radio Flux | | Sweep Freq Intensity | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Begin | Max | Half Max | Class | Integ Flux | Imp/ Brtns | Location Lat CMD | Rgn # | 245 | 2695 | II | IV |

**No Events Observed**

## *Flare List*

| | Time | | | | Optical | | | |
|---|---|---|---|---|---|---|---|---|
| Date | Begin | Max | End | X-ray Class | Imp/ Brtns | Location Lat CMD | Rgn # |

No Flares Observed

## *Region Summary*

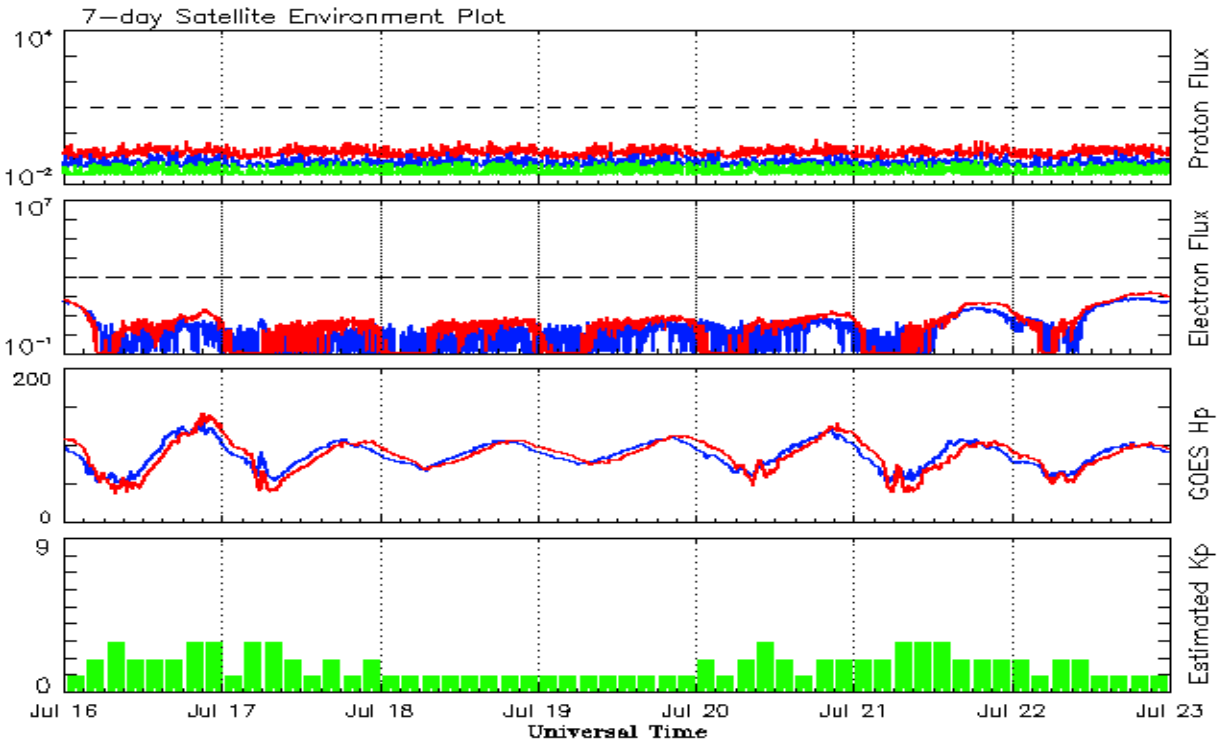
| | Location | | Sunspot Characteristics | | | | | Flares | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Helio | Area | Extent | Spot | Spot | Mag | X-ray | | | Optical | | | | |
| Date | Lat CMD | Lon | $10^{-6}$ hemi. | (helio) | Class | Count | Class | C | M | X | S | 1 | 2 | 3 | 4 |
| | | ***Region 2716*** | | | | | | | | | | | | | |
| 21 Jul | N16W00 | 199 | 10 | 1 | Axx | 1 | A | | | | | | | | |
| 22 Jul | N16W14 | 200 | plage | | | | | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 199

## *Recent Solar Indices (preliminary)*
## *Observed monthly mean values*

| | Sunspot Numbers | | | | | Radio Flux | | Geomagnetic | |
|---|---|---|---|---|---|---|---|---|---|
| | Observed values | | Ratio | Smooth values | | Penticton | Smooth | Planetary | Smooth |
| Month | SEC | RI | RI/SEC | SEC | RI | 10.7 cm | Value | Ap | Value |
| | | | | ***2016*** | | | | | |
| July | 36.8 | 19.4 | 0.53 | 36.5 | 23.1 | 85.9 | 87.7 | 10 | 11.2 |
| August | 50.4 | 30.1 | 0.60 | 34.2 | 21.6 | 85.0 | 85.5 | 10 | 11.2 |
| September | 37.4 | 26.8 | 0.72 | 32.1 | 19.9 | 87.8 | 83.7 | 16 | 11.3 |
| October | 30.0 | 20.0 | 0.67 | 31.1 | 18.9 | 86.1 | 82.5 | 16 | 11.6 |
| November | 22.4 | 12.8 | 0.57 | 29.4 | 17.9 | 78.7 | 81.1 | 10 | 11.6 |
| December | 17.6 | 11.1 | 0.64 | 28.1 | 17.1 | 75.1 | 80.0 | 10 | 11.4 |
| | | | | ***2017*** | | | | | |
| January | 28.1 | 15.7 | 0.55 | 27.3 | 16.7 | 77.4 | 79.4 | 10 | 11.3 |
| February | 22.0 | 15.8 | 0.71 | 25.5 | 15.9 | 76.9 | 78.7 | 10 | 11.3 |
| March | 25.4 | 10.6 | 0.42 | 24.6 | 15.4 | 74.6 | 78.6 | 15 | 11.5 |
| April | 30.4 | 19.4 | 0.64 | 24.3 | 14.9 | 80.9 | 78.4 | 13 | 11.5 |
| May | 18.1 | 11.3 | 0.62 | 23.1 | 14.0 | 73.5 | 77.7 | 9 | 11.3 |
| June | 18.0 | 11.5 | 0.64 | 22.0 | 13.3 | 74.8 | 77.3 | 7 | 11.3 |
| July | 18.8 | 10.7 | 0.59 | 20.8 | 12.6 | 77.7 | 76.8 | 9 | 11.0 |
| August | 25.0 | 19.6 | 0.80 | 19.7 | 11.8 | 77.9 | 76.3 | 12 | 10.7 |
| September | 42.2 | 26.2 | 0.62 | 18.6 | 11.0 | 92.0 | 75.9 | 19 | 10.3 |
| October | 16.0 | 7.9 | 0.49 | 16.8 | 10.0 | 76.4 | 75.1 | 11 | 9.8 |
| November | 7.7 | 3.4 | 0.44 | 15.7 | 9.2 | 72.1 | 74.6 | 11 | 9.5 |
| December | 7.6 | 4.9 | 0.64 | 15.7 | 9.1 | 71.5 | 74.4 | 8 | 9.4 |
| | | | | ***2018*** | | | | | |
| January | 7.8 | 4.1 | 0.51 | | | 70.0 | | 6 | |
| February | 16.0 | 6.4 | 0.40 | | | 72.0 | | 7 | |
| March | 6.0 | 1.5 | 0.25 | | | 68.4 | | 8 | |
| April | 7.0 | 5.3 | 0.76 | | | 70.0 | | 7 | |
| May | 15.0 | 7.9 | 0.53 | | | 70.9 | | 8 | |
| June | 19.7 | 9.5 | 0.48 | | | 72.5 | | 7 | |

**Note:** Values are final except for the most recent 6 months which are considered preliminary. Cycle 24 started in Dec 2008 with an RI=1.7.




*Weekly Geosynchronous Satellite Environment Summary*
*Week Beginning 16 July 2018*

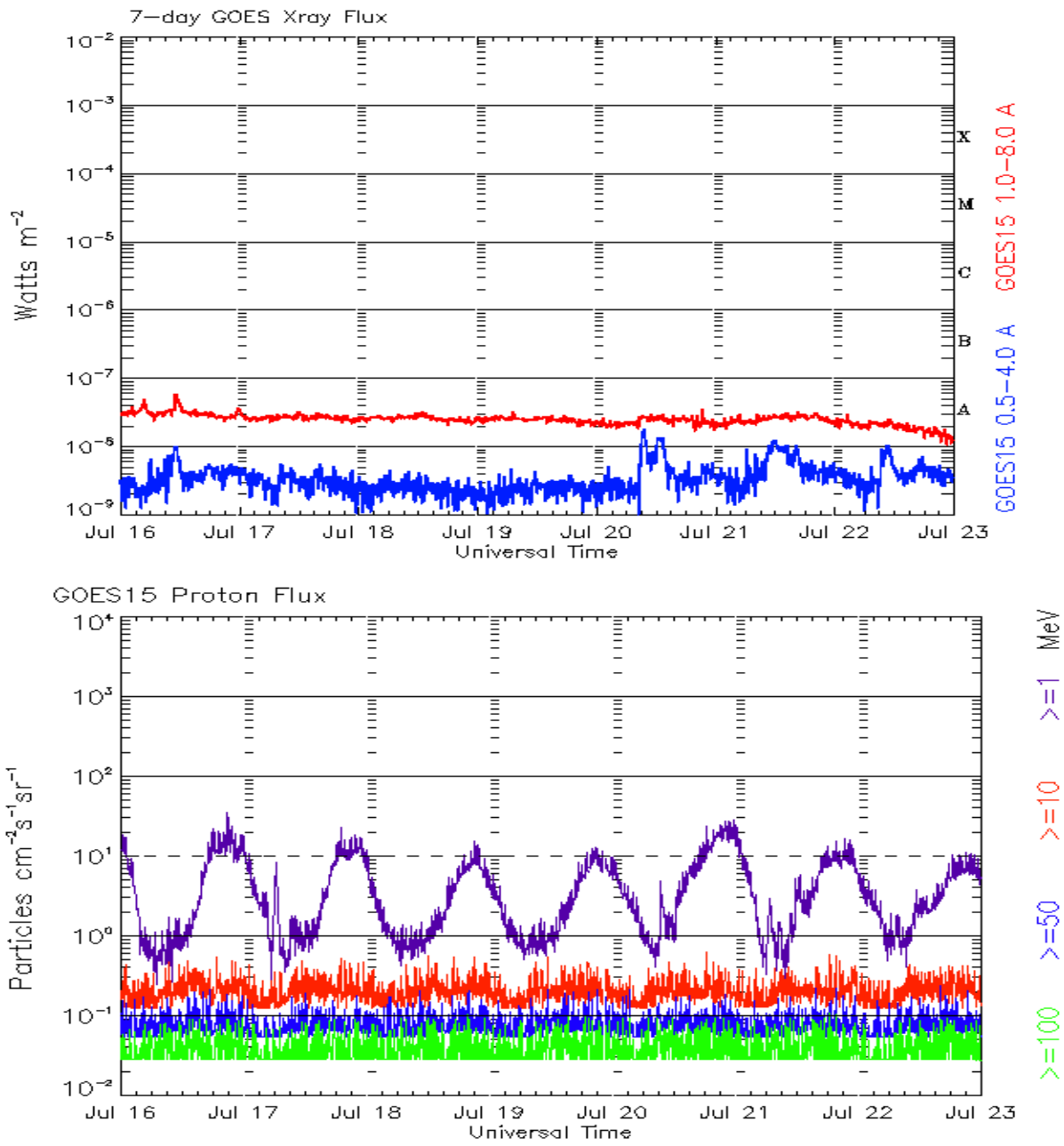
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm$^2$-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm$^2$-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

The Hp plot contains the five minute averaged Hp magnetic field component in nanoteslas (nT) as by the SWPC Primary GOES satellite. The Hp component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

The Estimated 3-hour Planetary Kp-index is derived at the NOAA Space Weather Prediction Center using data from the following ground-based magnetometers: Boulder, Colorado; Chambon la Foret, France; Fredericksburg, Virginia; Fresno, California; Hartland, UK; Newport, Washington; Sitka, Alaska. These data are made available thanks to the cooperative efforts between SWPC and data providers around the world, which currently includes the U.S. Geological Survey, the British Geological Survey, and the Institut de Physique du Globe de Paris.

The data included here are those now available in real time at the SWPC and are incomplete in that they do not include the full set of parameters and energy ranges known to cause satellite operating anomalies. The proton and electron fluxes and Kp are 'global' parameters that are applicable to a first order approximation over large areas. H parallel is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.




*Weekly GOES Satellite X-ray and Proton Plots*
*Week Beginning 16 July 2018*

The x-ray plots contains five-minute averages x-ray flux (Watt/m$^2$) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

The proton plot contains the five-minute averaged intergral flux units (pfu = protons/cm$^2$ -sec -sr) as measured by the primary SWPC GOES Proton satellite for each of the energy thresholds: >1, >10, >30, and >100 MeV. The P10 event threshold is 10 pfu at greater than 10 MeV.

## *Preliminary Report and Forecast of Solar Geophysical Data (The Weekly)*

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**Notice:** The 27-day Outlook, Satellite Environment, X-ray and Proton plots have been redesigned. Comments and suggestions are welcome SWPC.Webmaster@noaa.gov

The Weekly has been published continuously since 1951 and is available online since 1997.

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